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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/391,411	09/08/1999	YASUHIRO SATO	0557-4757-2	8571

22850 7590 03/24/2005

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EXAMINER	
WHIPKEY, JASON T	
ART UNIT	**PAPER NUMBER**
2612	

DATE MAILED: 03/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/391,411	SATO ET AL.	
	Examiner	Art Unit	
	Jason T. Whipkey	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 December 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,9-18 and 22-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,9-18 and 22-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1 and 13 have been considered but are moot in view of the new grounds of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-4, 6, 10-14, and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishizuka (U.S. Patent No. 5,946,032) in view of Tomitaka (Japanese Patent Application Publication No. 07-264463) and Nagata (U.S. Patent No. 5,606,456).

Regarding **claims 1 and 13**, Ishizuka discloses a camera shake correcting apparatus, as shown in Figure 9. The system includes digital integrating circuits 22 and 28 ("a shaking detector") for receiving signals from angular velocity sensors 1 and 10, which detect motion in a vertical and a horizontal direction ("camera coordinate axes"), respectively (column 8, lines 47-51). Digital integrating circuits 22 and 28 also act as calculators by integrating the pitch and yaw angles output by angular velocity sensors 1 and 10 to produce correction angles for variable angular prism assembly 7, which is displaced horizontally and vertically ("a deviation correction device") (column 8, lines 51-55, and column 9, lines 18-25).

Ishizuka is silent with regard to including a rotation regulator for rotating an image pickup device around a z-axis corresponding to the optical axis.

Tomitaka discloses an image pickup device that performs handshake correction, as shown in Drawing 1. Angular velocity sensor 5 corrects shaking of the camera around an optical axis by rotating lens block section 4, which includes solid state image pickup element 3 (abstract, lines 1-6).

An advantage to correcting shaking in the direction around an optical axis by rotating an image sensor is that further stabilization of the image captured by the camera may be achieved beyond simple x- and y-direction stabilization. For this reason, it would have been obvious at the time of invention to have Ishizuka's camera rotate its image sensor around the optical axis.

Ishizuka is silent with regard to including at least a pair of acceleration sensors on camera coordinate axes of the camera.

Nagata discloses an image processing apparatus and display system, as shown in Figure 1. The camera includes acceleration sensors S'1 and S'2 located on the shown axis (column 3, line 66, through column 4, line 8). These sensors are used to detect movement orthogonal to acceleration sensors S1 and S2, which are on another axis (see column 4, lines 7-10). The outputs of these acceleration sensors are used by division circuit 30 and adder 40 in calculating the tilt of the optical axis (see column 4, lines 31-43).

An advantage of including two pairs of acceleration sensors in the camera is that the camera can register movement in all directions, including directions orthogonal to other acceleration sensors. For this reason, it would have been obvious at the time of invention to have Ishizuka's camera include pairs of acceleration sensors on camera axes.

Regarding **claims 2 and 14**, Ishizuka teaches that part 7 is a variable angular prism (column 9, lines 18-25).

Regarding **claims 3 and 4**, Tomitaka discloses that angular velocity sensor 5 senses the angular velocity around the optical axis (abstract, line 2).

Regarding **claim 6**, Ishizuka shows in Figure 9 that angular velocity sensor 10 is oriented horizontally.

Regarding **claims 10 and 22**, Ishizuka shows in Figure 9 that variable angular prism assembly 7 ("an optical system of the camera") corrects camera shake using the measurements obtained by angular velocity sensors 1 and 10 and processed by digital integrating circuits 22 and 28.

Regarding **claims 11 and 23**, Ishizuka shows in Figure 9 that variable angular prism assembly 7 corrects camera shake using the measurements obtained by angular velocity sensors 1 and 10 and processed by digital integrating circuits 22 and 28.

Regarding **claims 12 and 24**, Tomitaka teaches that motor 6 adjusts the position of both lens 1 and solid state image pickup element 3 together, since both are contained in lens block section 4 (abstract, lines 1-6).

5. Claims 5, 7, 9, and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishizuka in view of Tomitaka and Nagata and further in view of Miyazawa (U.S. Patent No. 5,331,365).

Claims 5, 9, and 15 may be treated like claims 1, 3, and 14, respectively. However, both Ishizuka and Tomitaka are silent with regard to including a low-pass filter to remove a frequency band over 20 Hz from the outputs of the angular velocity sensors.

Miyazawa discloses a camera shaking detection apparatus with the circuitry shown in Figure 4. The circuitry includes low-pass filter 26, which removes shaking signal components with a frequency of more than 20 Hz (column 4, lines 51-53). As stated in column 5, lines 3-8, the advantage to removing frequencies greater than 20 Hz is that interference may be removed. For this reason, it would have been obvious at the time of invention to have Ishizuka include a low-pass filter that removes shaking signal components with a frequency of more than 20 Hz, such as the one described by Miyazawa.

Regarding **claim 7**, as described above, Tomitaka discloses that angular velocity sensor 5 senses the angular velocity around the optical axis (abstract, line 2). Ishizuka shows in Figure 9 that angular velocity sensor 10 is oriented horizontally.

Regarding **claims 16 and 17**, Tomitaka discloses that angular velocity sensor 5 senses the angular velocity around the optical axis (abstract, line 2).

Regarding **claim 18**, Ishizuka shows in Figure 9 that angular velocity sensor 10 is oriented horizontally.

6. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishizuka in view of Tomitaka and Nagata and further in view of Kurosawa (Japanese Patent Application Publication No. 09-331476) and Kondoh (U.S. Patent No. 4,689,514).

Claim 25 may be treated like claims 1. However, Ishizuka is silent with regard to rotating the image pickup device on a shaft located on the Z axis.

Kurosawa discloses the camera shown in Drawing 1. The camera includes the structure shown in Drawing 4, which rotates CCD image sensor 124 around an optical axis using revolving shaft 121a, which is part of step motor 121 (see page 4, lines 12-13, of the provided computer translation).

An advantage of using such a method of rotation is that an image tilt may be corrected (see page 6, lines 7-9) with a minimum of parts — for example, no gears are necessary between the motor and the image sensor. For this reason, it would have been obvious at the time of invention to have Ishizuka's camera correct shake by rotating an image sensor using a shaft located on the optical axis, as described by Kurosawa.

Ishizuka is also silent with regard to including a multi-layer piezoelectric actuator on the image pickup device.

Kondoh discloses a displacement-generating device used with an imaging device, as shown in Figure 14. CCD 200 is moved by two bimorph piezoelectric actuators 206 and 208 in order to displace the image radiated on the CCD through lens 210 (see column 9, line 63, through column 10, line 12).

As stated in column 1, lines 21-28, an advantage of using such an actuator is that very precise positions may be rapidly set, thus increasing the accuracy of the displacement of the imager. For this reason, it would have been obvious at the time of invention to have Ishizuka's camera displace its image sensor using the piezoelectric actuators described by Kondoh.

7. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishizuka in view of Tomitaka and Nagata and further in view of Kurosawa.

Claim 26 may be treated like claims 1. However, Ishizuka is silent with regard to rotating the image pickup device on a shaft.

Kurosawa discloses the camera shown in Drawing 1. The camera includes the structure shown in Drawing 4, which rotates CCD image sensor 124 around an optical axis using revolving shaft 121a, which is part of step motor 121 (see page 4, lines 12-13, of the provided computer translation).

An advantage of using such a method of rotation is that an image tilt may be corrected (see page 6, lines 7-9) with a minimum of parts — for example, no gears are necessary between the motor and the image sensor. For this reason, it would have been obvious at the time of

invention to have Ishizuka's camera correct shake by rotating an image sensor using a shaft located on the optical axis, as described by Kurosawa.

8. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishizuka in view of Tomitaka, Nagata, and Miyazawa and further in view of Kurosawa (Japanese Patent Application Publication No. 09-331476) and Kondoh (U.S. Patent No. 4,689,514).

Claim 27 may be treated like claim 15. However, Ishizuka is silent with regard to rotating the image pickup device on a shaft located on the Z axis.

Kurosawa discloses the camera shown in Drawing 1. The camera includes the structure shown in Drawing 4, which rotates CCD image sensor 124 around an optical axis using revolving shaft 121a, which is part of step motor 121 (see page 4, lines 12-13, of the provided computer translation).

An advantage of using such a method of rotation is that an image tilt may be corrected (see page 6, lines 7-9) with a minimum of parts — for example, no gears are necessary between the motor and the image sensor. For this reason, it would have been obvious at the time of invention to have Ishizuka's camera correct shake by rotating an image sensor using a shaft located on the optical axis, as described by Kurosawa.

Ishizuka is also silent with regard to including a multi-layer piezoelectric actuator on the image pickup device.

Kondoh discloses a displacement-generating device used with an imaging device, as shown in Figure 14. CCD 200 is moved by two bimorph piezoelectric actuators 206 and 208 in

order to displace the image radiated on the CCD through lens 210 (see column 9, line 63, through column 10, line 12).

As stated in column 1, lines 21-28, an advantage of using such an actuator is that very precise positions may be rapidly set, thus increasing the accuracy of the displacement of the imager. For this reason, it would have been obvious at the time of invention to have Ishizuka's camera displace its image sensor using the piezoelectric actuators described by Kondoh.

9. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishizuka in view of Tomitaka, Nagata, and Miyazawa and further in view of Kurosawa.

Claim 28 may be treated like claim 15. However, Ishizuka is silent with regard to rotating the image pickup device on a shaft.

Kurosawa discloses the camera shown in Drawing 1. The camera includes the structure shown in Drawing 4, which rotates CCD image sensor 124 around an optical axis using revolving shaft 121a, which is part of step motor 121 (see page 4, lines 12-13, of the provided computer translation).

An advantage of using such a method of rotation is that an image tilt may be corrected (see page 6, lines 7-9) with a minimum of parts — for example, no gears are necessary between the motor and the image sensor. For this reason, it would have been obvious at the time of invention to have Ishizuka's camera correct shake by rotating an image sensor using a shaft located on the optical axis, as described by Kurosawa.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

11. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Whipkey, whose telephone number is (571) 272-7321. The examiner can normally be reached Monday through Friday from 8:30 A.M. to 6:00 P.M. eastern standard time, alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy Garber, can be reached at (571) 272-7308. The fax phone number for the organization where this application is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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March 15, 2005

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